

Remarks

I. Status of claims

Claims 1-28 were pending.

Claims 1 and 23 have been amended.

Claims 9 and 26 have been rewritten in independent form in response to the Examiner's indication that such amendments would place these claims in condition for allowance. Claim 10 depends from claim 9, and claims 27 and 28 depend from claim 26 and, therefore, these dependent claims are allowable for at least the same reasons as their respective base claims.

II. Claim rejections under 35 U.S.C. § 102(b)

The Examiner has rejected claims 1-8 and 12-18 under 35 U.S.C. § 102(e) over WO 99/42282. Claim 1 is an independent claim. Claims 2-8 and 12-18 depend from claim 1.

Independent claim 1 has been amended and now recites the step of "metering from a source reagent ampoule a selected quantity of a premixed liquid source reagent solution comprising a mixture of a lead precursor, a titanium precursor and a zirconium precursor in a solvent medium." In the PZT film forming methods disclosed in WO 99/42282, the precursors of the component metals are introduced into the deposition system from separate, respective source reagent ampoules, each containing a respective component metal precursor; the precursors of the component metals are not premixed into a liquid source reagent solution that is metered from a source reagent ampoule. For example, WO 99/42282 teaches that (page 22, second full paragraph; emphasis added):

Figure 3 is a schematic representation of a liquid delivery system 60 for simultaneous, controlled introduction of metalorganic compounds to a CVD reactor. The metalorganic compounds are in respective liquid solutions in reservoirs 50, 52 and 54 which are manifolded together by manifold 56 joined in liquid flow communication with liquid precursor stream feed line 58. From feed line 58, the precursor stream is flowed under the action of pump 68 through line 70 to the vaporization zone 72.

FIG. 3 clearly shows that the component metal precursors are metered from separate respective liquid reservoirs 50, 52, 54.

The Examiner has indicated that:

WO 99/42282 clearly discloses at page 17 that the precursors can be supplied to the vaporization zone in combination.

At page 17, WO 99/42282 teaches that (emphasis added):

[T]he liquid delivery MOCVD method of the invention may be carried out with the introduction of the precursor reagents to the vaporization zone of the process system in combination with one another, or separately. For example, multiple vaporizers may be employed to vaporize different precursors in separate vaporization operations, with the resulting vapors of the separate operations being blended for transport to the chemical vapor deposition chamber. The precursor vapor(s) may be mixed with carrier gas(es), e.g., argon, helium, nitrogen, etc., as may be necessary or desired in a given application.

The underlined portion of this teaching, however, merely corresponds to the liquid delivery method implemented by the system of FIG. 3, in which the component metal precursors are metered from separate respective liquid reservoirs 50, 52, 54 and then mixed in manifold 56 and in liquid precursor stream feed line 58.

Accordingly, WO 99/42282 fails to teach or suggest the step of metering from a source reagent ampoule a premixed liquid source reagent solution comprising a mixture of a lead precursor, a titanium precursor and a zirconium precursor in a solvent medium, as recited in claim 1. Indeed, WO/42282 teaches that (page 23, second paragraph; emphasis added):

The major advantage of this liquid delivery MOCVD approach is that liquids can be mixed just prior to vaporization; besides its simplicity, the ability to make slight composition adjustments via computer control (e.g., by metering the respective precursor liquids from the precursor liquids from the reservoirs to the pump and/or vaporization zone) makes this approach highly desirable.

If the system in WO 99/42282 were modified to meter a premixed liquid source reagent solution from a source reagent ampoule, as recited in claim 1, the modified system would not be able to mix the precursor liquid metal components separately, defeating the "major advantage" of the invention described in WO 99/42282. Thus, WO 99/42282 teaches away

from the method of claim 1, in which a *premixed* liquid source reagent solution comprising a mixture of a lead precursor, a titanium precursor and a zirconium precursor in a solvent medium is metered from a source reagent ampoule.

The Examiner also has indicated that:

Figure 3 of WO 99/42282 anticipates the limitation of "metering from a liquid source a selected quantity of a premixed ... in a solvent media" in that the liquid pump 68 is a liquid source containing a premixed solution of the precursors (the precursors are mixed in line 58) and selected quantities of the premixed solution are metered from the pump to the vaporization zone.

Claim 1, however, now recites that the premixed liquid source reagent solution is metered from a source reagent ampoule. The liquid pump 68 in FIG. 3 of WO 99/42282 is not a source reagent ampoule. Indeed, the only source reagent ampoules described in WO 99/42282 are the liquid reservoirs 50, 52, 54, each of which contains a different respective component metal precursor; none of the liquid reservoirs 50, 52, 54 contains a premixed liquid source reagent solution comprising a mixture of a lead precursor, a titanium precursor and a zirconium precursor in a solvent medium, as recited in claim 1.

For at least these reasons, the Examiner's rejection of independent claim 1 under 35 U.S.C. § 102(e) over WO 99/42282 should be withdrawn and the claim now should be allowed.

Claims 2-8 and 12-18 incorporate the features of independent claim 1 and therefore are patentable for at least the same reasons.

III. Claim rejections under 35 U.S.C. § 103(a)

A. Claim 11

The Examiner has rejected claim 11 under 35 U.S.C. § 103(a) over WO 99/42282 in view of WO 99/00/49646.

Claim 11, however, incorporates the features of independent claim 1 and therefore is patentable for at least the same reasons explained above.

B. Claims 19-21, 23, and 24

The Examiner has rejected claims 19-21, 23, and 24 under 35 U.S.C. § 103(a) over either WO 99/42282 in view of Horie (U.S. 6,387,182).

Claims 19 and 20 depend from independent claim 1. Horie does not make up for the failure of WO 99/42282 to teach or suggest the features of independent claim 1 discussed above. For at least this reason, the Examiner's rejection of claims 19 and 20 under 35 U.S.C. § 103(a) over either WO 99/42282 or WO 00/49646 in view of Horie should be withdrawn.

Independent claim 23 has been amended and now recites the step of metering from a source reagent ampoule a selected quantity of a premixed liquid source reagent solution comprising a mixture of a lead precursor, a titanium precursor and a zirconium precursor in a solvent medium. As explained above in connection with independent claim 1, WO 99/42282 does not teach or suggest such a step. For at least this reason, the Examiner's rejection of independent claim 23 under 35 U.S.C. § 103(a) over WO 99/42282 in view of Horie should be withdrawn.

Claim 24 incorporates the features of independent claim 23 and therefore is patentable for at least the same reasons.

C. Claim 22

The Examiner has rejected claim 22 under 35 U.S.C. § 103(a) over WO 99/42282 in view of Yamamuka (U.S. 6,312,526).

Claim 22 depends from independent claim 23. Yamamuka does not make up for the failure of WO 99/42282 to teach or suggest the features of independent claim 23 discussed above. For at least this reason, the Examiner's rejection of claim 22 under 35 U.S.C. § 103(a) over WO 99/42282 in view of Yamamuka should be withdrawn.

D. Claim 25

The Examiner has rejected claim 25 under 35 U.S.C. § 103(a) over WO 99/42282 in view of Horie and Yamamuka.

Claim 25 depends from independent claim 23. Neither Horie nor Yamamuka, taken alone or in any permissible combination, make up for the failure of WO 99/42282 to teach or suggest the features of independent claim 23 discussed above. For at least this reason, the Examiner's rejection of claim 25 under 35 U.S.C. § 103(a) over WO 99/42282 in view of Horie and Yamamuka should be withdrawn.

VI. Conclusion

For the reasons explained above, all of the pending claims are now in condition for allowance and should be allowed.

Charge any excess fees or apply any credits to Deposit Account No. 50-1078.

Respectfully submitted,

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